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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Yoshio NAKAGAWA et al.:

Serial No. 09/705,838:

Group Art Unit: 1771

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Examiner: V. S. CHANG

For: ADHESIVE TAPE AND SUBSTRATE FOR ADHESIVE TAPE

DECLARATION UNDER 37 CFR 1.132

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Honorable Commissioner of  
Patents and Trademarks,  
Washington, D.C. 20231

Sir:

I, Yoshio NAKAGAWA, whose full post office address is  
c/o Nitto Denko Corporation, 1-2, Shimohozumi 1-chome,  
Ibaraki-shi, Osaka 567-8680 Japan, sincerely declare:

That my education and employment history is as follows:

I was graduated from Department of Applied Chemistry,  
Faculty of Engineering, Kumamoto Institute of Technology in  
March 1995, and

In April 1995, I was employed by Nitto Denko  
Corporation, and I have been engaged in the research and  
development of adhesive tape products at Tape-Material  
Business Sector, Substrate R & D Center of Nitto Denko  
Corporation;

That I am one of the inventors of the above-identified  
U.S. Patent Application No. 09/705,838 and familiar with the  
subject matter of this invention;

That I have reviewed the Office Action dated April 1,  
2002 issued in the above-identified application and have  
directly conducted the following experiments to show that  
the use of ethylene-propylene terpolymer (Epsyn 7506),  
which is used in Examples of Tucker et al. (USP No.  
5,498,476), as Component B in the present invention fails  
to afford the effect of the present invention;

That the following Experiments, the results of which  
follow hereunder, demonstrate such fact;

## Experiments

(Materials used)

Component A (thermoplastic resin having a carbonyl oxygen atom in the molecular skeleton)

A1: ethylene-vinyl acetate copolymer (EVA) (trademark: EVAFLEX P-1905, Du Pont-Mitsui Polychemicals Company, Ltd.) (same as A1 used in Examples of the present invention)

Component B (polymer alloy containing an ethylene component and a propylene component)

B1: CATALLOY KS-353P (trademark), Montell SKD Sunrise Ltd. (same as B1 used in Examples of the present invention)

Comparative B: Epsyn 7506 (trademark), ethylene-propylene terpolymer, 77% ethylene, 5.5 C/100 C unsaturated, available from Copolymer (used in Examples of Tucker et al.)

Component C (inorganic flame retardant)

C1: magnesium hydroxide ( $\text{Mg}(\text{OH})_2$ ) (trademark: Magshizu N-3, Konoshima Chemical Industrial Co., Ltd.) (same as C1 used in Examples of the present invention)

C2-2: red phosphorus (trademark: Norbaexcell F5, Phosphorus Chemical Industry Co., Ltd.) (same as C2-2 used in Examples of the present invention)

C3: carbon black (trademark: Shisuto 3H, TOKAI CARBON CO., LTD.) (same as C3 used in Examples of the present invention)

(compounding ratio of substrate)

Component	Present Invention*	Comparative Experiment
A1	50	50
B1	50	-
Comparative B	-	50
C1	100	100
C2-2	8	8
C3	2	2

\* The compounding ratio is the same as in Example 2 of the present invention.

The values in the Table are in parts by weight.

(Preparation of samples)

(1) Preparation of adhesive tape

According to the compounding ratios shown in the above Table under "Present Invention" and "Comparative Experiment", the predetermined amounts of Compound A, Compound B and Compound C were dry blended and kneaded in a 10 inch mixing roll. The kneaded blend was formed into a 0.20 mm-thick film with an 8 inch inverted L-shaped type calender roll to give a tape substrate. One surface of the tape substrate was subjected to the corona discharge treatment and the acrylic adhesive used in the Examples of the present invention was applied thereon (thickness 30  $\mu$ m) to give an adhesive tape.

(2) Preparation of test piece for evaluation of flame resistance

The kneaded blends of Compound A, Compound B and Compound C obtained in the above-mentioned (1) for "Present Invention" and "Comparative Experiment" were formed into a 3 mm-thick sheet with a press machine, from which sheet was obtained a test piece (length 70 mm, width 6.5 mm).

(3) Preparation of test piece for measurement of dynamic storage modulus of Comparative B component (Epsyn 7506)

The Comparative B component was pressed with a press machine to give a test piece (thickness 0.2 mm, width 10 mm, length 20 mm).

(Evaluation)

(1) The adhesive tapes obtained in the above for "Present Invention" and "Comparative Experiment" were measured for elongation at break, thermal deformation and dynamic storage modulus according to the method described in the present specification.

(2) The oxygen index of the substrate of the adhesive tapes obtained above for "Present Invention" and "Comparative Experiment" was measured according to the method described in the present specification, using the test piece for evaluation of flame resistance.

(3) The dynamic storage modulus of Comparative B component was measured according to the method described in the present specification, using the test piece for measurement of dynamic storage modulus.

(Results of experiment)

	Elongation at break (%)	Thermal deformation (%)	Dynamic storage modulus (MPa)		Oxygen index (%)
			80°C	120°C	
Present Invention	370	30	49	15	33
Comparative Experiment	490	100	6	2	40

The thermal deformation at 100°C of the adhesive tape obtained in Comparative Experiment was 100%, which failed to satisfy the level of not more than 65% required in the present invention.

The dynamic storage moduli at 80°C and 120°C of the adhesive tape obtained in Comparative Experiment were dramatically lower than those of the adhesive tape of the present invention.

	23°C	80°C	120°C
Dynamic storage modulus of Comparative B component (MPa)	2	1	0.7

The dynamic storage moduli at 23°C, 80°C and 120°C of Comparative B component failed to satisfy the level defined in the present invention.

(Discussion)

As is clear from the above-mentioned results of the Experiments, the use of ethylene-propylene terpolymer (Epsyn 7506), which is used in Examples of Tucker et al. (USP No.

5,498,476), as Component B in the present invention fails to afford the effect of the present invention.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Osaka, Japan on this 26<sup>th</sup> day of September, 2002

... *Yoshio Nakagawa* .....  
Yoshio NAKAGAWA